Implicit two-point block method for solving fourth order initial value problem directly with application

ABSTRACT

This paper proposes an implicit block method with two-point to directly solve the fourth-order Initial Value Problems (IVPs). The implicit block method is derived by adopting Hermite interpolating polynomial as the basis function, incorporating the first derivative of to enhance the solution's accuracy. A block formulation is presented to acquire the numerical approximation at two points simultaneously. The introduced method's basic properties, including order, zero stability, and convergence, are presented. Numerical experiments are carried out to verify the accuracy and efficiency of the proposed method compared with those of the several existing methods. Application in ship dynamics is also presented which yield impressive results for the proposed two-point block method.